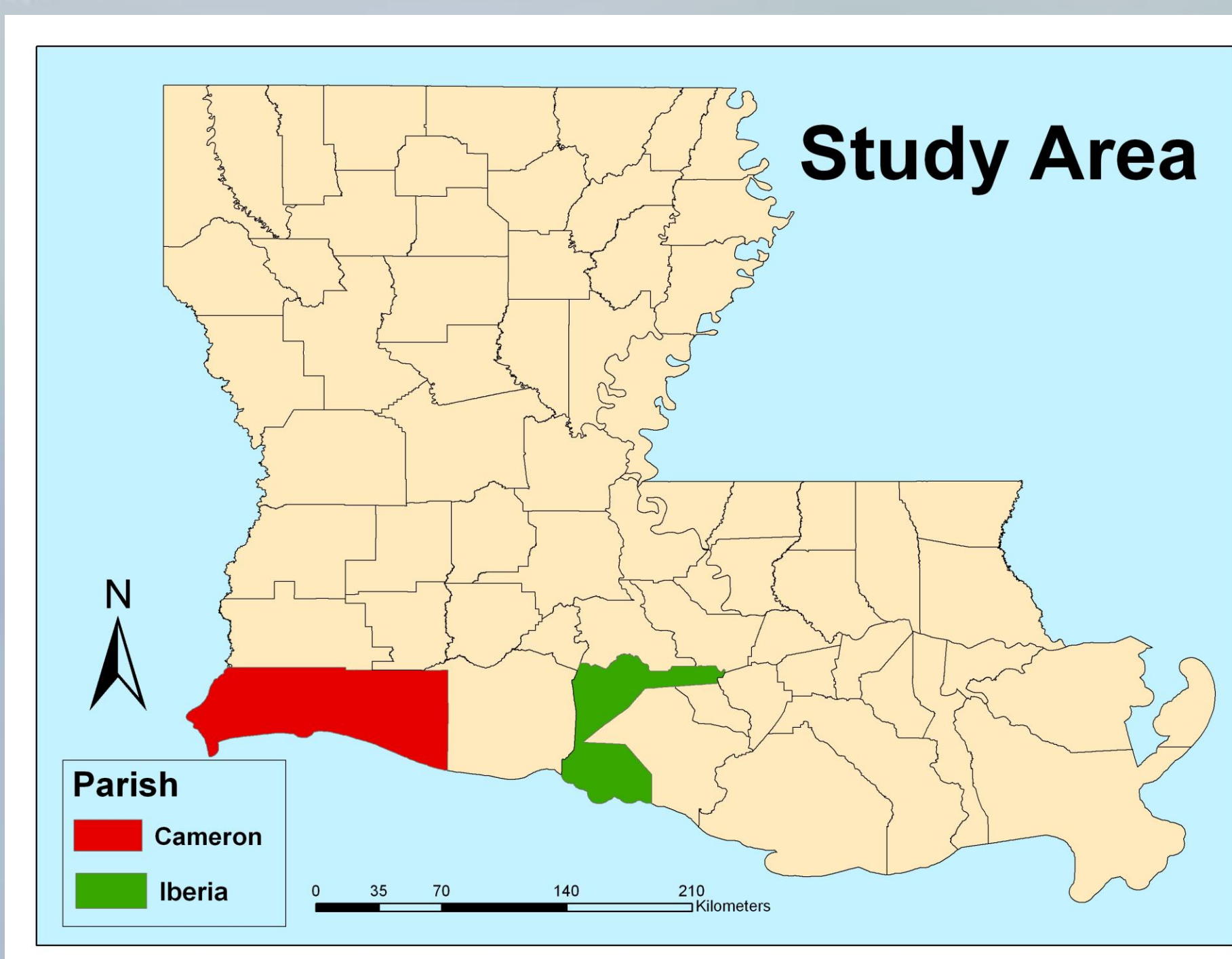


OBJECTIVES

- Utilize ASTER aboard *Terra* and *Landsat 5* to quantify hectares of sugarcane fields and marshland burned annually
- Determine emission estimates using area calculations and algorithms developed by the EPA
- Employ MODIS Active Fire data to determine location and frequency of these biomass fires in Louisiana

STUDY AREA



Iberia Parish was chosen for the sugarcane portion of the study because it produces the most sugarcane in the state.

Cameron Parish contains the largest amount of marshland making it the prime choice for studying marsh burning.

PROJECT PARTNERS

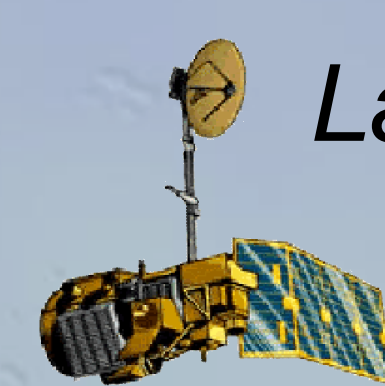


Environmental
Protection Agency



University of
Louisville, KY

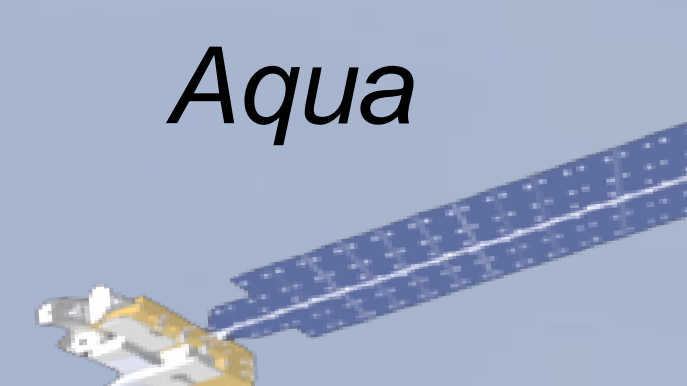
EARTH OBSERVATION SOURCES



Landsat 5



Terra

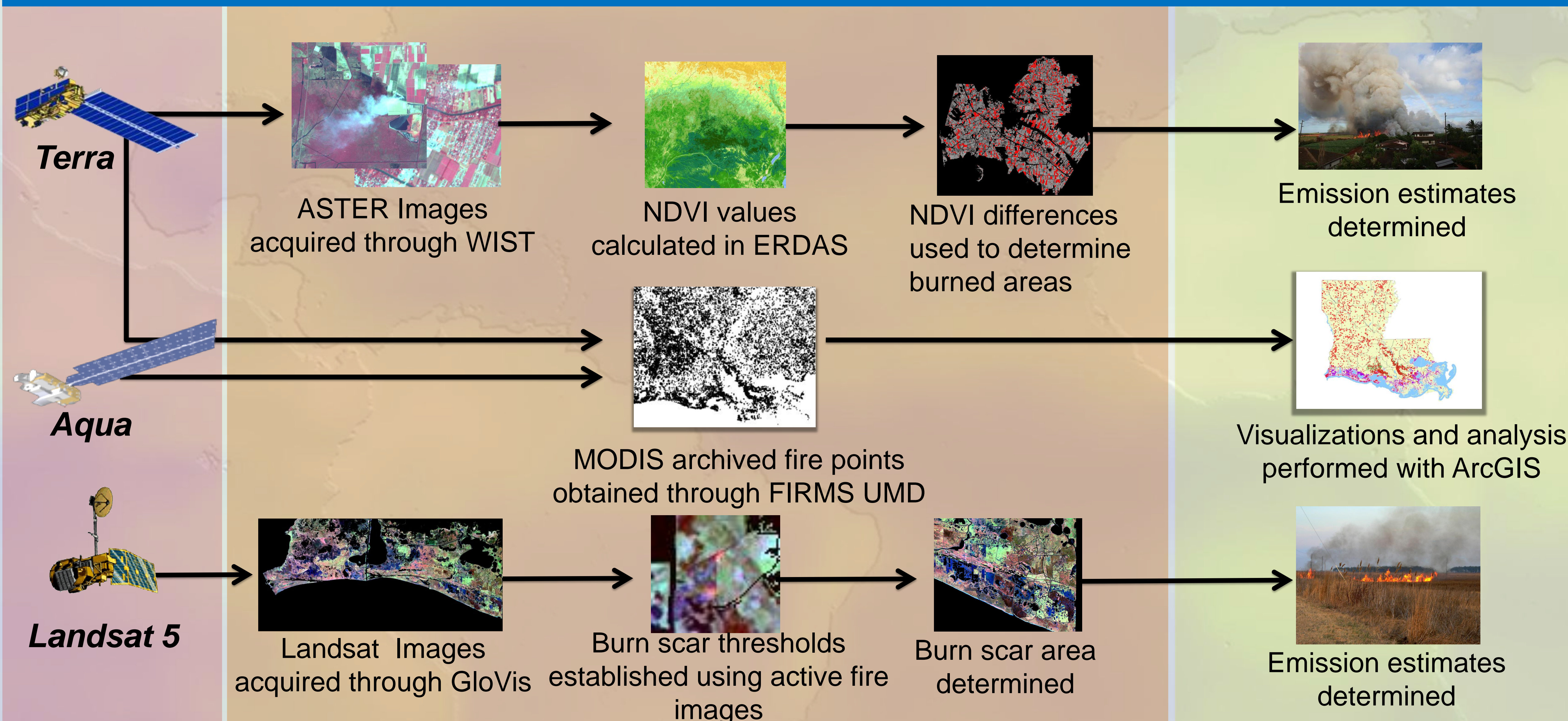


Aqua

ABSTRACT

Biomass burning is an event that occurs globally and encompasses both human-initiated and naturally-occurring fires. It is estimated that 3 billion metric tons of biomass are burned every year worldwide (Curtis 2002). Societies have used these burning techniques for cooking and heating, clearing land for agricultural use, and removing excess biomass from grazing and crop lands (Levine 1991). Our study focuses on the state of Louisiana and its commonly occurring methods of sugarcane and marsh biomass burning (LSU Ag. Center 2000; Nyman and Chabreck 1995). Over the centuries, the sugarcane industry in this state has steadily grown to surpass all other agriculture commodities. To promote efficiency within this large industry, burning excess biomass takes place throughout the harvesting period (LSU Ag. Center 2000). In addition to sugarcane, Louisiana contains 30% of the total coastal marsh of the United States (LSU Ag. Center 2000). The periodic burning of such marshes is an ecologically important management tool that is practiced throughout the Atlantic and Gulf Coasts (Nyman and Chabreck 1995). In most biomass burning instances, the leading by-product is particulate matter that is less than 10 microns in diameter (PM₁₀). Through past research, this fine material has been shown to have negative health effects on surrounding populations (Boopathy 2001). While burning guidelines have been set into place by the Louisiana Department of Agriculture and Forestry (LDAF) to reduce health effects, the guidelines are voluntary (LDAF 2000). To help quantify emission estimates, we will focus on Iberia Parish for sugarcane burning and Cameron Parish for marsh burning. Through analysis of ASTER, Landsat 5 TM, and MODIS data, our goal is to determine the amount and location of land area burned for the years 2008 and 2009 due to these practices. With emissions algorithms from Seiler and Crutzen, 1980, total acreage burned can be used to estimate emissions. This information will help to document the impact of these smoke plumes on local populations for the improvement of biomass burning policies in Louisiana.

METHODOLOGY



CONCLUSIONS

- Previous biomass burning and emission estimates for the state of Louisiana may have been understated.
- A monthly analysis of MODIS fire point data showed peaks in November and February for sugarcane and marsh burning, respectively.
- Using ASTER images and NDVI differencing, more accurate information about total burned area can be obtained.
- Sugarcane and marsh burning may be significant contributors to poor air quality in Louisiana.
- A re-evaluation of current biomass burning policies could help to mitigate the health risks posed to vulnerable populations in southern Louisiana.

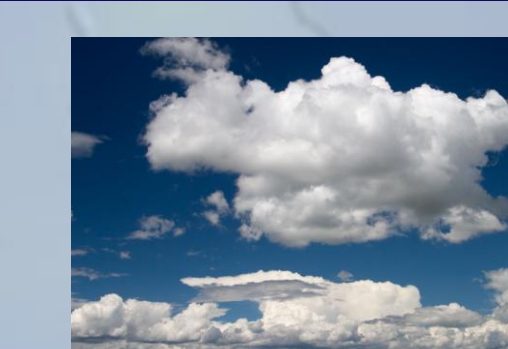
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ACKNOWLEDGMENTS

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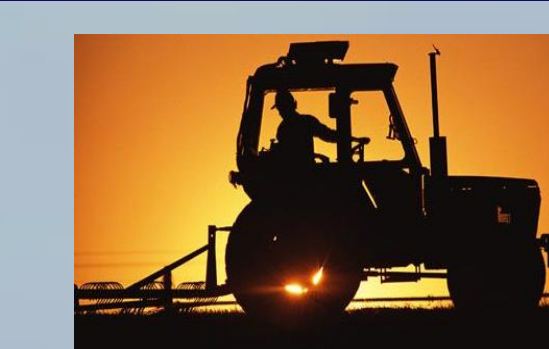
NATIONAL APPLICATION AREAS



Air Quality



Public Health



Agriculture

RESULTS

Emission Estimates

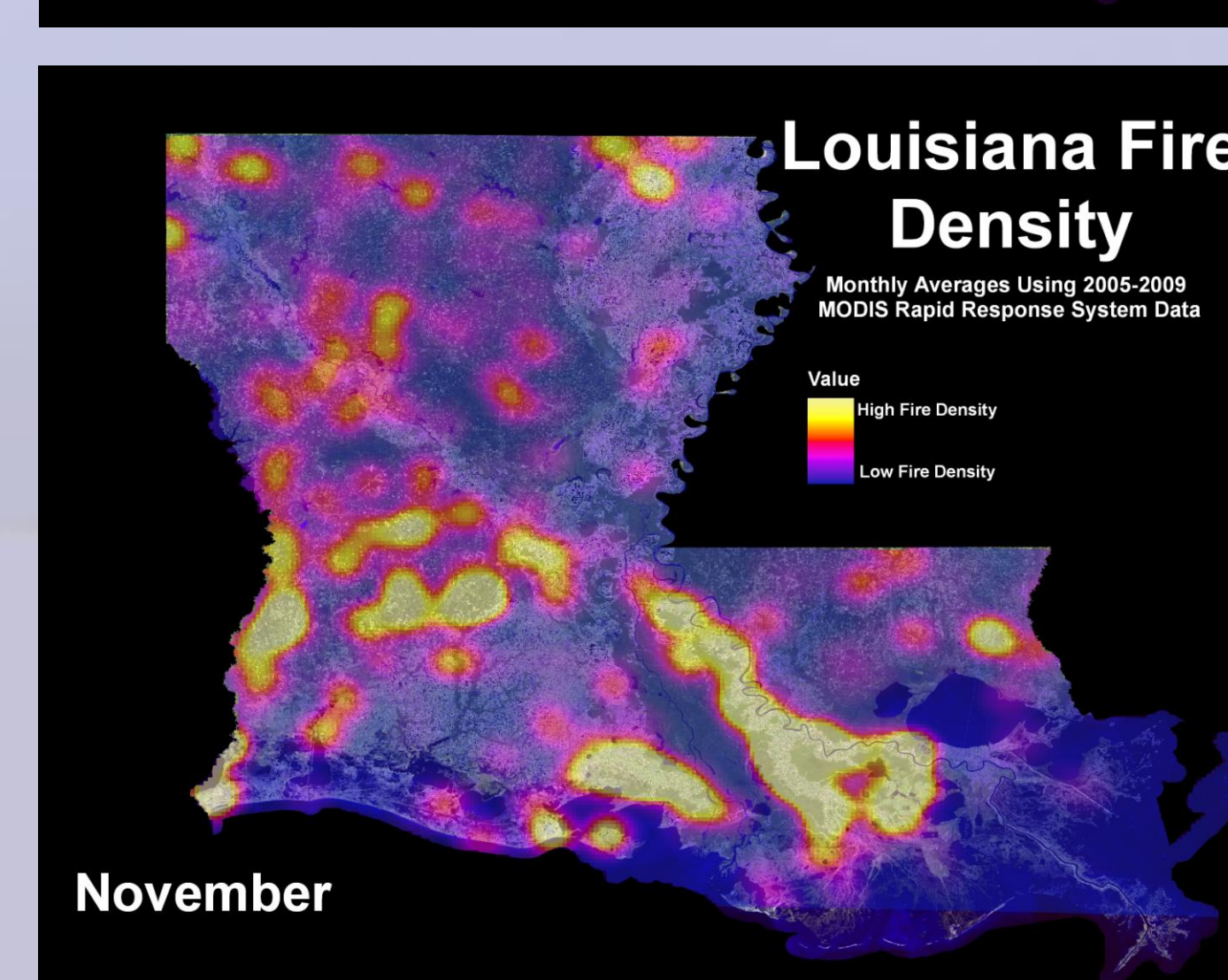
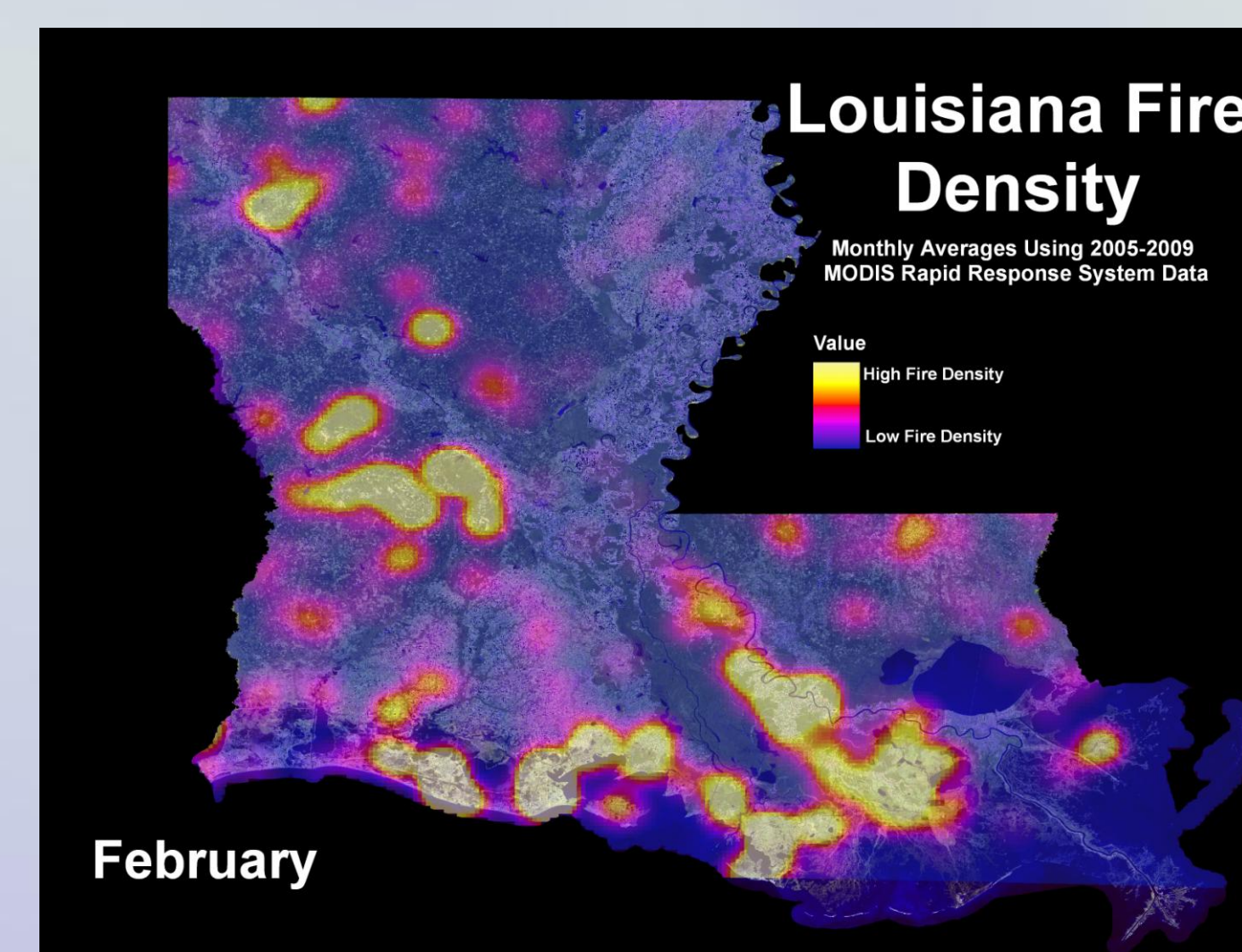
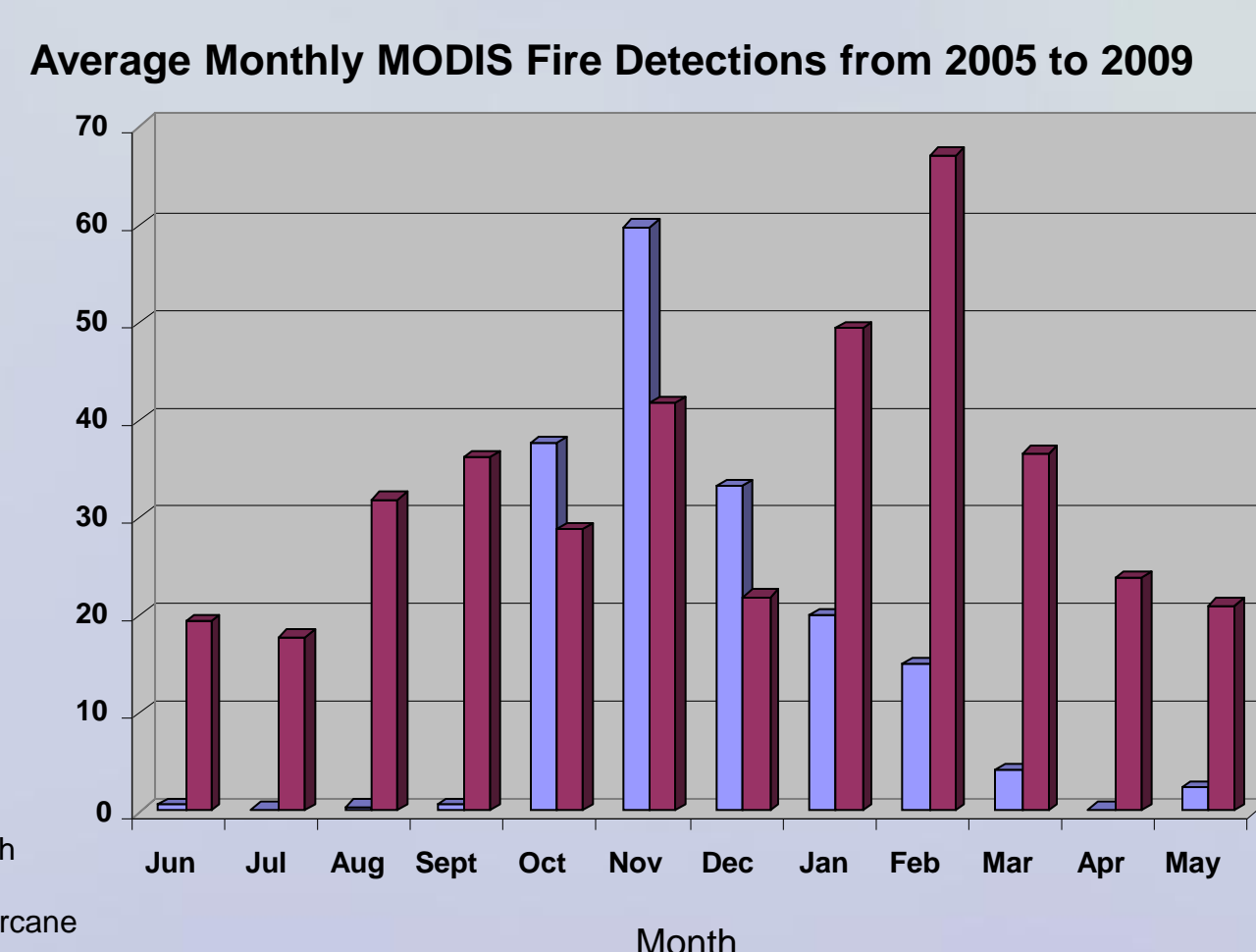
Iberia Parish Sugarcane Burning September 2009 - January 2010

Atmospheric Species	Minimum	Mean	Maximum
Carbon Dioxide*	N/A	194.67 Gg	N/A
Carbon Monoxide	3.27 Gg	7.51 Gg	11.82 Gg
Methane	0.052 Gg	0.15 Gg	0.35 Gg
Nitrogen Dioxide	0.18 Gg	0.39 Gg	0.68 Gg
Sulfur Dioxide	0.051 Gg	0.21 Gg	0.51 Gg
PM 2.5	0.5 Gg	0.56 Gg	0.64 Gg
PM 10	0.57 Gg	0.63 Gg	0.69 Gg
Lead*	N/A	0.000064 Gg	N/A

Cameron Parish Marsh (Wiregrass) Burning

September 30, 2008 - February 20, 2009

Atmospheric Species	Minimum	Mean	Maximum
Carbon Dioxide	486.2 Gg	488.8 Gg	491.4 Gg
Carbon Monoxide	12.10 Gg	12.51 Gg	12.92 Gg
Methane	.116 Gg	.175 Gg	.233 Gg
Nitrogen Dioxide	N/A	N/A	N/A
Sulfur Dioxide	N/A	.233 Gg	N/A
PM 2.5	N/A	1.51 Gg	N/A
PM 10	N/A	2.91 Gg	N/A



ASTER - active fires Nov. 1, 2008



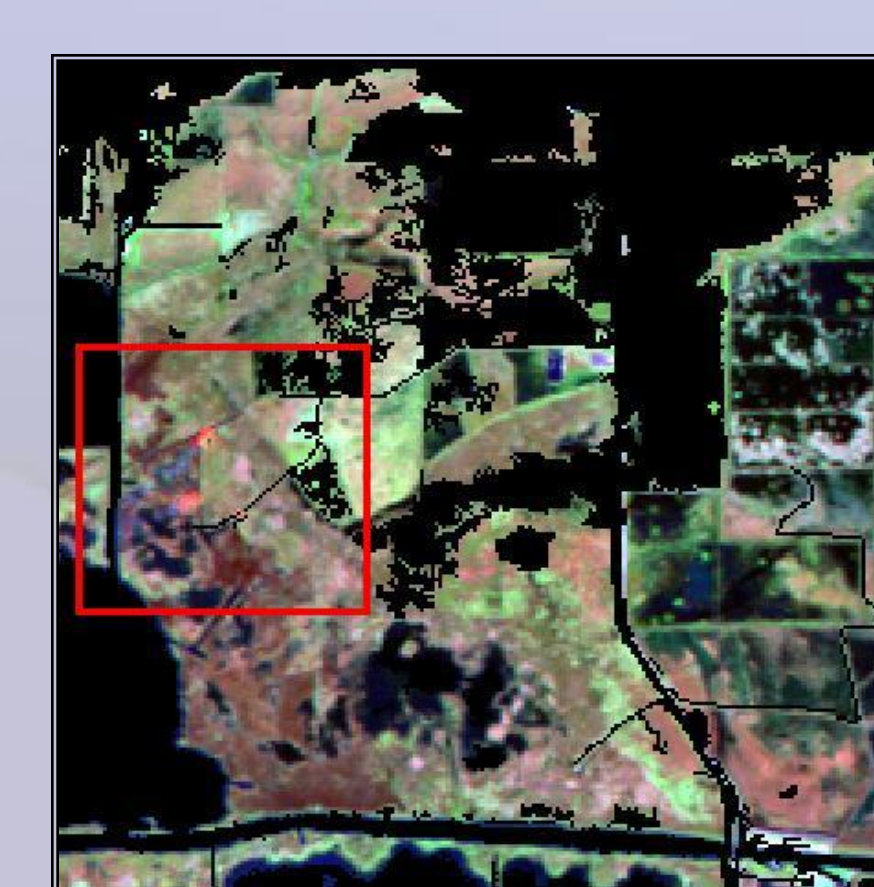
Red areas represent sugarcane fields burned between Sept. 1 and Nov. 4, 2009



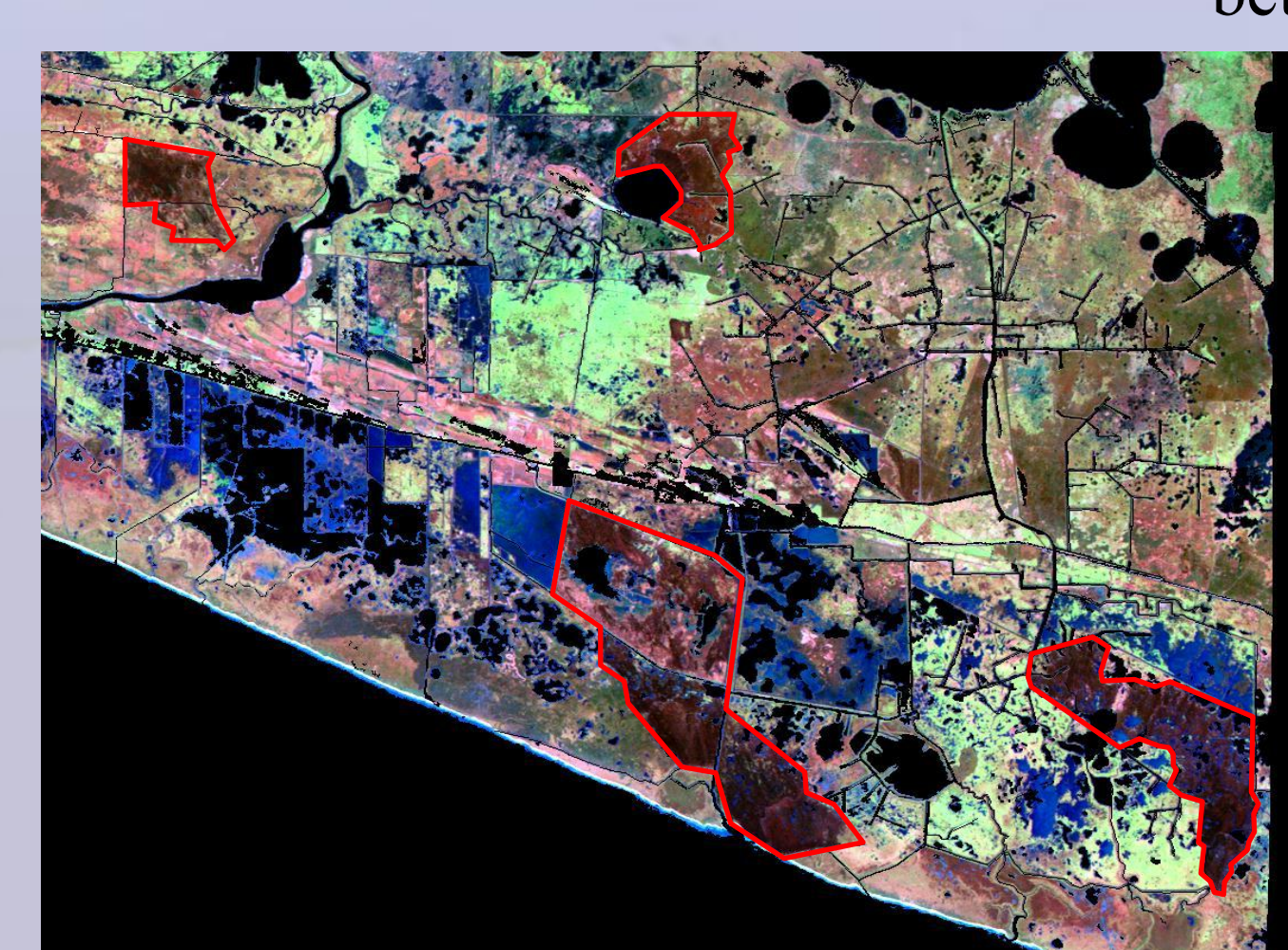
Burned Area Estimates

Sugarcane	19,759 ha
Marsh	23,164 ha

Accuracy assessment on burned sugarcane fields product showed 93% accuracy.



Landsat - active fire Feb. 4, 2009



Burn scars - Jan. 19, 2009

